

REMARKS

Claims 15 and 20 are amended to more particularly point out that the surface of the substrate includes microcracks and that the zirconium phosphate layer in Applicants' invention fills the microcracks, as described at page 3, lines 9-17.

Claim Rejection based upon newly cited Japanese Patent Document

Claims 20 and 22-24 are rejected under 35 U.S.C. § 102(b) as anticipated by Japanese Patent Document JP 11-090226, referred to herein as JP '226.

The rejection relies on a lengthy and poor English translation. In JP '226, a material containing zirconium phosphate is applied for purpose of adsorbing hydrocarbon compounds, see page 15, last paragraph. In the Working Example beginning at page 28, line 22, with particular attention to the description beginning at page 30, line 6, zirconium silicophosphate is added as a solid material and is dispersed as particles in the slurry. Because its purpose is to adsorb hydrocarbon, the zirconium silicophosphate is selected to have large pore size or interlayer distance, a dimension relating to crystalline structure. Thus, JP '226 uses material having a pore size or interlayer distance of at least 5 Å, page 15. The material in the Working Example is characterized by an interlayer distance of 5-10 Å. Thus, the zirconium phosphate material is not dissolved, but rather the properties of the solid are intended to be retained in the product.

In contrast, the layer in Applicants' invention is formed by applying a solution of

zirconium carbonate and phosphoric acid, see page 5, lines 18-22, and page 8, lines 8-10. During calcining, the water is vaporized, and the residual zirconium phosphate is deposited. As a result, the zirconium phosphate deposits in and fills the microcracks in the surface of the substrate. It is significant that the layer is at least 4 nanometers thick, and preferably 10 nanometers, to assure a sufficient supply of zirconium phosphate to fill the microcracks. The zirconium phosphate prevents the microcracks from expanding when exposed to high temperatures during processing and use, thereby improving durability, page 3, lines 9-17. Further, this is accomplished without adversely affecting catalyst performance. Because the zirconium phosphate material in JP '226 is applied as pre-formed particles, it does not fill the microcracks, so that soluble binder material that is applied subsequently in a catalyst washcoat can seep into the microcracks and expand, thereby enlarging the cracks and reducing the durability of the substrate, see the application, page 9, lines 1-11. Also, note the alumina binder material used in Working Example in JP '226, page 30, lines 13-17. Nothing in JP '226 contemplates filling the microcracks in the substrate to prevent the binder for the catalyst-bearing washcoat from enlarging them. Thus, JP '226 does not teach or suggest Applicants' invention.

Claim 20 is directed to Applicants' catalytic converter that includes a substrate and a zirconium phosphate layer disposed on the substrate. The zirconium phosphate layer fills the microcracks in the surface of the substrate. JP '226 describes zirconium phosphate material applied as particles and sized to have a large pore size or interlayer distance. The large particles do not fill the microcracks, so that soluble binder in

subsequent catalyst washcoat can enter and expand the cracks. It is pointed out that, since the zirconium phosphate material in JP '226 is used for hydrocarbon adsorption, it is desirable that the particles be disposed on the surface to be exposed to exhaust gas, and not buried within the microcracks. In any event, JP '226 does not fill microcracks in the substrate, and so does not teach or suggest Applicants' catalytic converter with filled microcracks, as set forth in claim 20.

Claims 22-24 are dependent upon claim 20 and so not anticipated by JP '226 at least for the reasons set forth with regard to that claim.

Therefore, it is respectfully requested that the rejection based upon JP '226 be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection based upon JP '226, Swaroop et al., Cyron et al. and Deeba et al.

Claims 15 and 17-19 are rejected under 35 U.S.C. § 103 as unpatentable over JP '226 in view of United States Patent No. 5,447,694, issued to Swaroop et al.; United States Patent No. 5,114,681, issued to Cyron et al.; and United States Patent No. 6,375,910, issued to Deeba et al.

Claim 15 is directed to a catalytic converter comprising a substrate having microcracks, and a zirconium phosphate layer that fills the microcracks, features also set forth in claim 20. For the reasons above, JP '226 applies a particulate material adapted

for hydrocarbon adsorption and so does provide a zirconium phosphate layer to fill the microcracks before applying the washcoat for the catalyst layer. Thus, JP '226 does not show Applicants' catalytic converter in claim 15.

Swaroop et al., Cyron et al. and Deeba et al. are applied to show a shell surrounding the substrate. However, none of the secondary references apply a zirconium phosphate layer to fill microcracks in the substrate. Thus, even if combined with JP '226, there is nothing in the references to lead the practitioner to apply a zirconium phosphate layer to fill the microcracks in the substrate. Without this, the references cannot be fairly read as pointing to Applicants' invention in claim 15, or in claims 17-19 dependent thereon.

Therefore, it is respectfully requested that the rejection based upon JP '226, Swaroop et al., Cyron et al. and Deeba et al. be reconsidered and withdrawn, and that the claims be allowed.

Claim Rejection based upon JP '226, Swaroop et al., Cyron et al., Deeba et al. and Hampton

Claim 16 was rejected under 35 U.S.C. § 103 as unpatentable over JP '226 in view of Swaroop et al.; Cyron et al., and Deeba et al, and further in view of Deeba et al. and United States Patent No. 5,950,423, issued to Hampton.

Claim 16 is dependent upon claim 15. For the reasons above, JP '226, Swaroop et al., Cyron et al., and Deeba et al. do not show Applicants' catalytic converter in claim 15 that includes a zirconium phosphate layer that fills the microcracks in the substrate.

Deeba et al. and Hampton are applied to show a substrate formed of a cordierite material containing zirconia. However, Deeba et al. and Hampton do not apply a zirconium phosphate layer to the substrate to fill microcracks. Thus, even if combined, the references do not lead the practitioner to Applicants' catalytic converter in claim 15, or in dependent claim 16.

Therefore, it is respectfully requested that the rejection based upon JP '226, Swaroop et al., Cyron et al., Deeba et al. and Hampton be reconsidered and withdrawn, and that claim 16 be allowed.

Claim Rejection based upon JP '226, Swaroop et al., Cyron et al., Deeba et al. and Hampton

Claim 21 was rejected under 35 U.S.C. § 103 as unpatentable over JP '226 in view of Deeba et al. and Hampton.

Claim 21 is dependent upon claim 20. For the reasons above, JP '226 does not show Applicants' catalytic converter in claim 20 that includes a zirconium phosphate layer that fills the microcracks in the substrate. Nor does Deeba et al. or Hampton show

this feature. Thus, even if combined, the references do not lead the practitioner to Applicants' catalytic converter in claim 20, or in dependent claim 21.

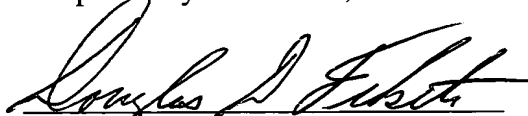
Therefore, it is respectfully requested that the rejection based upon JP '226, Deeba et al. and Hampton be reconsidered and withdrawn, and that claim 21 be allowed.

Conclusion

It is believed, in view of the amendments and remarks herein, that all grounds of rejection have been addressed and overcome, and that all claims presently in the case are in condition for allowance. If it would further prosecution of the application, the Examiner is urged to contact the undersigned at the phone number provided.

The Commissioner is hereby authorized to charge any fees associated with this communication to Deposit Account No. 50-0831.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Douglas D. Fekete", written over a horizontal line.

Douglas D. Fekete

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